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The Honorable Michael K. Powell, Chairman
Federal Communications Commission
445 12th Street, S.W.
Washington D.C. 20554

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MAY 10 2002

FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

May 6, 2002

Dear Chairman Powell:

On November 21, 2001, Nextel Communications, Inc. ("Nextel") filed with the Commission a proposal that looks toward realigning the 800 MHz band. Island SMR, Inc. ("Island SMR") has studied the proposal and, on behalf of the shareholders and Board of Directors of this Hawaii Corporation, we respectfully submit herein our preliminary views. Island SMR feels that there was not enough time allotted from March 14, 2002, when the NPRM Docket No. 02-55 was adopted, to adequately respond both technically and completely to the NPRM. Although the Commission generally notifies licensees of dockets affecting their licenses, it does not appear that the FCC did so in this case. Many small entities were left unaware of the proceeding, which made it extremely difficult for these entities to develop a reasoned response. We feel that the FCC should have notified potentially affected licensees that this Docket, if approved, would negatively affect their businesses. Island SMR attempted to notify as many of them as possible and we confirmed their views to be in agreement with ours. The details of our views are as follows.

Response to FCC NPRM Docket No. 02-55

INTRODUCTION

Island SMR, Inc. is the largest analog 800 MHz Carrier in Hawaii. It was established in May, 1998 and features 10 radio dispatch sites, four with Telephone Interconnect, supporting approximately 5,000 loyal subscribers. Its shareholders consist of approximately 90 individuals, many of whom are retired and Island SMR, Inc. is an important part of their retirement asset portfolio. Many of these same shareholders, as former licensees of the FCC, experienced the many scams associated with the Goodman-Chan Act. These innocent investors were affected so negatively, and unjustly lost many of their licenses due to small administrative errors. This dark era caused many people to become skeptical about SMR companies and not wish to invest in

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them. Due to this uncertainty surrounding this industry, Island SMR, Inc. was forced to work very hard to persuade its investors to stay with them and continue to invest in their future. Island SMR worked very diligently and spent a great deal of money on FCC attorney fees to reinstate many of our licensee's licenses before we could assign them to our company. Island SMR basically challenged the system and was successful in preserving many licenses, that would otherwise have been dismissed by the Commission for insignificant and hardly justifiable cause. Unfortunately, this is the arena in which we are forced to survive against the giants like Nextel, who have batteries of FCC attorneys and former FCC employees, who serve as lobbyists in Washington to further their successes in the industry. It is not a level playing field, and unfortunately again, there is little we can do to change the way the system is conducted. To a small SMR like us, our spectrum, which we had to pay dearly for, is our largest and most precious asset. We estimate the cost of replacing our infrastructure equipment, i.e. Repeaters, Combiners, Multicouplers, Receiver Amplifiers, Power amplifiers, RF Modems, and Test Equipment to be extremely costly. Another consideration in addition to the infrastructure cost is the redundancy of our infrastructure, which our customers require, to minimize down time of their radio systems. Concurrent with the infrastructure replacement and duplication is the subscriber radios replacement. In our Motorola SmartNet system, a subscriber radio's price to the customer is about $600 to $700 each, with an additional $110. for installation, if it is a fixed mobile radio verses a portable hand-held radio. Therefore, this does not even take into consideration the possibility of additional sites being necessary to provide the same or better coverage to the customer, assuming 900 MHz is the new band in which we are forced to re-band in. That conservative estimate, assuming customers will require installation to take place after hours or on weekends, the conservative estimate is over $7,000,000.00!

If Island SMR is deemed responsible by the FCC to absorb this cost, as proposed by Nextel, Island SMR could be forced into receivership or bankruptcy. Many of its loyal customers would also be affected negatively, in the absence of Island SMR, they would be forced to go with Nextel's digital service. This itself, is a tremendous detriment to small businesses in Hawaii, which are already dealing with a weak economy. Being susceptible to economic swings, Hawaii would continue to suffer, if over 300 companies and agencies would be forced to purchase new radio equipment. Already suffering from the 911 tragedy, these small businesses and agencies would

be required to pay monthly service fees that amount to over three times their current amount.

Other 800 MHz users in Hawaii besides Island SMR, Inc., that would definitely be effected negatively by the Nextel proposal being approved in its present content are as follows:

Honolulu Police Department
Maui Police Department
Kauai Police Department
Chevron Oil Refinery
Tessoro Oil Refinery
Federal Express Corporation
Ameron H C & D.
Air Liquide
Harmer Communications, Inc.
Hawaii Crane and Rigging
First Hawaiian Bank
Delta Communications
Gomes Bus
Aeronautical Radio Inc.
Koolau Management Inc.
Lanai Company
Marco Polo AOAO
Asia Pacific Communications, Inc
1100 Alakea Corporation
All Star/SAB Pacific JV
American Hawaii Cruises
Atlas Maui Inc.
Brigham Young University
DHL Worldwide Express
First Hawaiian Center
Hawaii Prince Hotel
Honolulu Park Place
Ihilani Inc, DBA JW Marriott
Japan Amenity Travel
Kaiser Permanente Hospital
Kintetsu International Express
Kuilima Resort Company
Lanai Pines Sporting Clays

Additional 800 MHz Operators & Private Users in the United States

There are many, many other users, both commercial and private, in the 800 MHz band that would also be economically and severely damaged, if they were forced to pay for their own re-banding. Although Island SMR would have liked to attach a list of these licensees, such a list would be hundreds of pages long. Suffice is to say there are thousands of licensees that would be affected by realignment of the 800 MHz band, including large companies such as Boeing and small companies such as Island SMR and Business Autophones. Business Autophones, which operates a 44 channel trunked system with 15-20 towers in Tazewell, Virginia. This company has spent years building its system. If it is forced to retune to new frequencies at its own costs, it will go bankrupt. Small companies such as Island SMR and Business Autophones cannot afford to retune their systems at their own costs, nor should they be required to do so as they are not the ones causing interference to public safety operations.

Shareholder Negative Financial Impact

Many of Island SMR's stockholders, who formerly owned FCC 800 MHz licenses and exchanged them for stock in the corporation, would suffer greatly from a mandatory re-banding ultimatum. Many are senior citizens who have made investments in this corporation, and are counting on its success to supplement their retirement income. The approval of the NPRM Docket #02-55 as written, would cause the financial demise of many of Island SMR, Inc.'s shareholders, and the mere submittal of the proposal by Nextel (Nov. 21, 2001), to the FCC has caused much consternation and uncertainty for the 800 MHz SMR Carriers. Island SMR, Inc., would no longer be able to attract additional investors for capital investment for expansion or equipment upgrades. So in this sense, Nextel, with a mere suggestion of re-banding, and the fact that if its NPRM was adopted and is seriously being considered for rule making, has negatively affected the investment atmosphere of the entire 800 MHz SMR industry.

Technical Engineering Issues

We hereby submit an independent assessment and analysis exhibit **(Exhibit A)** by a professional RF Engineer, who was formerly employed by Nextel as V.P. of Engineering in New York City. The exhibit attached for your reference, entitled ***Analysis and Response to Motorola's "Interference Technical Appendix"*** dated February, 2002, as a result of APCO's complaints of interference with their 800 MHz systems. Particularly interesting is the fact that, when confronted with specific intermodulation claims in New York City (One of the largest densities of two way 800 MHz trunked radios in the US), by Public Safety users and APCO, Nextel indeed spent a great deal of money and time in addressing the issues technically and was able to eliminate the interference completely in New York City. This is witnessed by the Nextel Engineer, who is very much opposed to Nextel's lack of candor in admitting to the FCC that they are interfering, but then recently taking the position that they are only a portion of the cause, when in fact, APCO's Project 39 Interim Report dated December 24, 2001, clearly stated that Nextel was the predominant cause of the interference with Public Safety users.

The RF Engineer also agrees that Nextel not only knows they are the culprits, but is hiding the fact that they know how to fix the problems but instead are opting for this proposal to re-band the incumbent 800 MHz users,

which would be a potential windfall for Nextel in several ways. First they would pick up all contiguous spectrum, which adds value and allows them much more flexibility and reliability with no chance for causing interference, and secondly they would pay a ridiculously low amount of money for 10 MHz of 2.1 GHz terrestrial spectrum, which is worth over $10 Billion at the auction block. The New York City resolution of the interference problem by Nextel further proves that given the proper resolve and capital, Nextel can indeed fix the interference problems all over the country instead of causing everyone else hardship by re-banding. The Nextel proposal seems to suggest that re-banding is the **only** method to fix the interference. This is categorically incorrect. The FCC should force Nextel to repeat the process in New York City everywhere this interference is present and magically, the problem will disappear. Ironically, Nextel will not get their windfall of contiguous spectrum and their terrestrial spectrum for a fraction of what it is worth, but more importantly Public Safety users will be free of interference and small businesses like Island SMR, Inc. will continue to provide affordable and reliable communications to the small businesses and agencies in the State of Hawaii, and many other States in the US mainland.

Motorola owns over 30% of Nextel, and stands to receive a great deal of new business from Public Safety users and other 800 MHz users that will be forced to replace their radios due to re-banding, if Nextel's proposal is approved. We believe that Motorola has a responsibility to advise its co-company, Nextel, of any dangers of interference by means of their infrastructure equipment or take steps to eliminate the interference by special equipment being added to filter the signals at each high site locations. (See Exhibit A) Radio is indeed an inexact science, but both Motorola and its customer and co-company, Nextel know very well what to do to fix the interference problems. It is simply a matter of money, and now the FCC is considering approving their proposal just to demonstrate to the Public that something is being done to fix the high-profile problem. Instead the FCC should force Nextel to comply with the rules and regulations, which they say they do, but do not, and pay the costs to eliminate the interference in all locations.

The New York City resolution would be costly for Nextel to apply nationwide, and thus their reluctance to face up to their responsibility and do something to make it happen. The reality of this situation is Nextel does not wish to pay the amount necessary to fix the interference problems with Public Safety, but instead wishes to persuade the FCC to force the

incumbents like Island SMR, Inc., who is not at fault, to pay for the re-banding. Before considering Nextel's proposal in any way, the FCC should accept Nextel's admission that it is causing harmful interference to adjacent channel licensees and take the enforcement steps necessary to stop all interference to adjacent channel licensees caused by Nextel. The Commission should use its full range of enforcement powers, from imposing limitations on Nextel's operation; to denying further Nextel operation; to conditioning, canceling or revoking offending Nextel licenses to stop the interference. Only when Nextel is no longer imposing on its spectrum neighbors can the FCC reasonably consider any proposal for changes to its current spectrum plan.

For more than 50 years the Commission's policy has been to require the newcomer to a frequency to bear the responsibility for remedying any interference that it may cause. (See *Midnight Sun Broadcasting Co.*, 11 FCC 1119 [1947]). This policy is more commonly known as the "last man in" policy. Where the date of commencement of Nextel's operation of a digital system is or was subsequent to the date of authorization of an adjacent channel station, the policy should be applied to require Nextel, alone, to remedy the problem that Nextel has caused. In its white paper, Nextel proposed to pay some of the cost of relocating public safety licensees to other spectrum, but placed a cap on its willingness. In *Broadcast Corporation of Georgia (WVEU-TV)*, 96 FCC 2d 901 (1984), the FCC refused to allow the licensee of the interfering station to limit its financial liability to adjacent channel licensees. Nextel knew or should have known of the WVEU-TV precedent and not allow Nextel to limit in any way its financial liability to remedy all interference that it may cause. Once Nextel is removed as a cause of interference to adjacent channel licensees, then the FCC will be in a position to move forward to evaluate easily the interference, if any remaining, caused by other licensees and to deal with those situations swiftly and accordingly.

Incumbency Relocation Precedence

Island SMR, Inc. successfully completed an incumbency relocation of 15 of its Upper 800 MHz channels in exchange for 15 lower 80 channels from Nextel and was compensated for its inconvenience and the inconvenience of its customers in making the transition as smooth as possible. This agreement by Nextel to provide 15 unencumbered channels as part of the incumbency relocation exchange did indeed set a precedent in these types of retuning

practices. Now, Nextel, having just completed this transaction is now proposing to completely re-band not just Island SMR but all incumbent 800 MHz users, and more importantly, to pay for that re-banding themselves, instead of Nextel paying for the entire process, which is the precedent formerly set and agreed upon by Nextel. If the re-banding is decided by the FCC to be mandatory, then the entity gaining from this exchange, namely Nextel, is morally and financially liable for compensation to Island SMR or the incumbent, in the same manner in which they did previously.

911 Effect on Hawaii's Economy

Due to the tragedy of September 11, 2001, a significant number of customers of Island SMR, Inc.'s analog 800 MHz trunking dispatch service have cancelled due to the negative economic and financial impact. The State is undergoing somewhat of a recession due to all the cut backs of tourist travel and tightening of security measures. Tourism is Hawaii's largest industry and due to the 911 tragedy our tourist count was significantly reduced. Even seven months later the economy is still not sufficiently recovered from the pre-911 period. If Nextel's proposal is approved, and Island SMR, Inc. is forced to close its operations, its present customers will be forced to find other more expensive sources of communications service, such as Nextel digital iDEN service. Not only would many of the companies like Island SMR go bankrupt and disappear, their customers will be forced to pay higher monthly service fees, and purchase new equipment in order to continue to communicate with their employees. This definitely affects the Hawaii economy negatively and further reduces its ability to recover from its losses.

To further illustrate the negative economic influence the closing of Island SMR's operations would result in, perhaps a historical example would be appropriate. In 1998, Nextel introduced its TDMA digital technology known as iDEN by Motorola to the State of Hawaii. This service was marketed as the latest and greatest and Nextel salespersons insisted to the customers that analog was dead! This proved not to be the case and the loyal customer base that Island SMR supports today is evidence of the failure of the average blue-collar businessman to believe the sales propaganda that was being spread by Nextel sales Representatives. Nextel's corporate management dictated the strategies that the local Nextel management was to follow and little care for the analog customer was being displayed. The target market was the PCS and cellular market. The existing

customers soon flocked to Island SMR, when they realized the information that was being disseminated by the Nextel sales people was simply not factual, and the very same analog service that they were enjoying with Nextel prior to the introduction of digital, could be received with a simple reprogramming process and no additional cost per month. The customers were elated with this alternative and Island SMR's business began to expand and prosper. The customer's never forgot the lack of concern Nextel displayed for their well being during the transition from analog to digital. Nextel basically said that if the customer did not subscribe to the new digital service, they would simply shut them off immediately. They were given only one month to consider and then they were shut off. Island SMR technicians worked all hours of the day and night to reprogram these customers to insure minimum amount of downtime to their service. Again, this high regard for the customer displayed by Island SMR was never forgotten.

My point here is that Nextel, as a corporation has already demonstrated its total disregard for the customer's well being in this transition from analog to digital over four years ago. This "take it or leave it" attitude with respect to changes that affect the user is evident even today. This new proposal to re-band the incumbent 800 MHz users is simply another case of Nextel trying to improve their own well being by receiving contiguous 800 MHz spectrum and 2.1 GHz of valuable terrestrial spectrum, in the trade for only less than 20 cents on the dollar, when the terrestrial spectrum is worth at least $20 Billion on the auction block.

In addition, the Nextel proposal if approved as drafted, will systematically eliminate its analog and digital competition in the 800 MHz band. What is this one fail swoop windfall for Nextel worth....untold amount? Although APCO seems to endorse the proposed Nextel Package; many of its members do not support the endorsement at all. For example, all the Police Departments in the State of Hawaii that use 800 MHz spectrum, namely Honolulu, Maui and Kauai all oppose the Nextel proposal as it is written. Captain Jeffrey Amaral, Maui Police Dept., who was mentioned in Nextel's proposal as another source of interference, that exists but did not mention that Maui PD has been trying to get Nextel to fix it for some time and they have not responded positively. Their larger agenda obviously, was not best served by fixing the problem like Nextel did in New York City.

Unlike the US mainland, Hawaii does not experience that degree of interference that endangers potential Public Safety users. For this reason, a sequel to APCO's Project 39 should be immediately, mandated by the Commission on a State-by-State basis. The result of this field study should be adopted and used as a guideline for those States specifically effected by the interference and those States not heavily effected should be allowed to stay with their present 800 MHz spectrum. The economy benefits positively, the SMR Carriers are left to enjoy their existing channels, the FCC receives relief by an equitable resolution to the interference problem and the customers are free to continue use of an affordable means of communicating with their employees and staff. Everyone wins!

Nextel's Dominance of Spectrum & Widespread Private Interest Lobby

It is well known in the Industry that Nextel employs many former retired FCC personnel and management and continues to manipulate the FCC into approving just about whatever it wants them to approve. Small license holders such as Island SMR have to struggle to retain what little spectrum they have when all Nextel has to do is suggest a rule change and the FCC jumps to adopt an NPRM. The "old boy" network is alive and well and this unfair favoritism needs to be exposed and eliminated.

Nextel's Passive Response to PCIA Forum Questions

At the recent PCIA open forum meeting in Dallas in March of this year, the Nextel moderator, Mr. Geoff Stearns, V. P., Legal Counsel for Nextel, attempted to address the barrage of questions the audience, made up of operators, consultants and users alike, but instead gave the excuse that their technical staff were all in Salt Lake City at the Winter Olympics. This was an official forum in which Nextel was supposed to persuade the participants of the merits of their proposal and discuss the negative aspects so as to understand both sides' perspective. Many participants, like Island SMR, traveled from far away to hear these arguments and try to understand Nextel's point of view. Nextel's vague attempt to dismiss the questions as inappropriate and by not having technical engineering staff available to officially state clearly Nextel's technical stance and address any concerns that the audience had regarding previous technical field tests that some of the audience had experienced and attempted to inform the audience of. Instead, Nextel assumed somewhat of an arrogant attitude that "you are entitled to your opinion and we are entitled to ours".

Nextel is trying to assert its influence on the FCC by not only keeping quiet about knowing how to fix the interference problems without re-banding, but also with extra Public Relations attempts such as the "911" Documentary program recently hosted on national TV by Robert DeNiro, showing never before seen videos of the WTC inside, showing firefighters and policemen trying to communicate with their two way radios but not being able to. There was utter confusion but the reason had nothing to do with the interference problem, the WTC 1 Bldg had just collapsed and most of the municipal repeater equipment went down with it, not permitting the hand held portables to talk. The program was sponsored by Nextel and was a subtle attempt to get public support for their proposal, by showing filmstrips out of context and trying to mislead the public to believe Nextel is supporting Public Safety. Now more recently, Nextel announced a strategic alliance formed between Nextel Communications, Inc. and Guiliani Partners, LLC to improve public safety communications across the United States. Mr. Rudy Guiliani, now considered one of the most respected officials involved in the WTC tragedy, with new world-renowned fame, is now being paid to further Nextel's propaganda and whitewash the public into believing Nextel's smoke and mirror approach. The reality is that their plan is not only clever but lucrative and self-serving for the purpose of gaining more spectrum and eliminating its competition.

Cause and Effect – Interference with Public Safety Users

The Nextel proposal somehow depicts itself as the victim and tries to blame the other CMRS/PMRS users for joint blame in causing the interference with Public Safety users. The APCO Project 39 Interim Report has categorically proven that Nextel is the predominant cause of the majority of the interference to its users. Even the Nextel proposal itself was frocked with inconsistencies and mistakes. For example, the error that stands out the most is the reference Nextel makes all through the white paper of "CMRS versus Public Safety Interference", which is erroneous and should have said "Nextel versus Public Safety Interference". CMRS includes all of the SMR analog operators, the PMRS users and some cellular carriers. This again is Nextel's clever way of disguising their guilt with other incumbent users of 800 MHz, who have nothing whatsoever to do with causing the interference. By spreading the guilt falsely to all the CMRS users, Nextel dilutes its own guilt and misleads the FCC into thinking it is a widespread cause instead of a

single perpetrator. By lumping themselves into this general and misleading category, Nextel shifts the responsibility, they think, to all of the innocent incumbent users and this should be rectified and clarified. Everyone is reluctant to stand up against Nextel, because they feel the FCC favors them. Let not this misconception be true. Hold Nextel responsible for their actions, that they knew well before they began their service. This was a calculated risk that Nextel took, knowing their strong lobby position with the FCC and Capitol Hill. They should not be allowed to misuse our system and gain valuable leverage due to their name and political influence. Please respectfully, disapprove the NPRM as drafted and hold Nextel, the real cause of the interference with Public Safety, responsible and demand that they fix the problem, with their own funds like a responsible FCC licensee and good corporate citizen.

We understand and sympathize with the Public Safety users' interference problem, and strongly urge the FCC, APCO and its associated members not to be fooled by the offer from Nextel, but to place responsibility on them to fix the problem, without causing disruption and unnecessary expense to the incumbent 800 MHz users.

Sincerely,

Bill J. Sanford
President & CEO
Island SMR, Inc.

Comments of Island SMR, Inc.
Exhibit A

Analysis and Response

To

Motorola's

"Interference Technical Appendix"

Dated February 2002

By John Hart
Comm.Systems Consulting
April 19, 2002

INTRODUCTION

The referenced Motorola document entitled "Interference Technical Appendix", issue 1.41, dated February 2002, was published as an effort to describe potential interference issues experienced by system operators and users in the 800 MHz band. The paper does a commendable job of educating the reader about the challenges faced by operators of large, wide-area multi-frequency radio networks. However, it does not go far enough in commenting on the technology issues that have contributed to Nextel's current notoriety as a major contributor to interfering with Public Safety operations.

This analysis will use the Motorola document as a source of information, which will be used to question some of the known technological system architecture deficiencies within iDEN, which contribute to the interference problem.

COMMENTS

Before getting into details, it is important to set the stage for the issues as they now exist. The following is a listing of "features" of the early Trunking, Cellular and Nextel/iDEN systems (the earlier NEXTEL "MIRS" architecture is not discussed):

Trunking Systems (800 MHz)

- Introduced in the 1970's, analog only
- Small systems, 5-10 channels, cavity combiners
- "New" spectrum, noise limited only
- Large-area coverage, single tall site
- Mobile units were modified crystal-based sets
- Mobile receivers had very good front-end selectivity
- Most users were single-system users
- Some subscribers could use "interconnect" mobile-phone-like services
- Only active channels were keyed

Cellular Systems

- Introduced in the mid-1980's, analog only
- Clear spectrum, no interference limitations
- AMPS architecture had built-in interference-control tools
- Large channel set groups, cavity combiners
- Tall sites were the norm, aimed at the horizon
- Systems were designed with a grid pattern, minimal reuse
- Mobile-unit-only subscriber sets (no portables), efficient antennas
- Mobile receivers had good front-end selectivity
- Only active channels were keyed

NEXTEL (iDEN) Systems

- Introduced in the mid 1990's, replacing MIRS
- Multi-site, wide-area use (dispatch & interconnect)
- Limited channel sets
- Tall sites, high power, hybrid combiners due to "ad hoc" channel spacing
- High power portables
- Most subscribers were dispatch users
- All channels keyed, all the time

Evolution of Services

The eventual evolution of these three distinct services/technologies has been driven by subscriber demands; the earlier subscriber distinction between the "business/dispatch user" (SMR/NEXTEL) and the "yuppie on the cellphone" has blurred and the services offered have become intertwined.

It is probably safe to say that Trunking (SMR) systems have evolved the slowest, partially due to the stability of the customer type (dispatch). Synthesized mobile radios and portables allowed SMR customers to subscribe to multi-SMR systems, giving them a broader coverage area. The user had to manually switch from one system to another as they approached the borders of the systems. The introduction of narrowband technology in the 900 MHz SMR band was one of the major innovations. Even though the frequency band change was not a great jump, the technology associated with 900 MHz brought with it new challenges and problems. The basics of trunking architecture still govern the setup and operation of these systems. Public Safety trunked systems fit within this category, with some added bells and whistles ("digital" capability being the major differentiator).

Cellular systems grew at a phenomenal rate in the 1990's and the technology strained to keep up with demand. While there was no doubt that the original concept of "cellular" could handle growth due to the tools built into the architecture, frequency spectrum availability could not keep up with the subscriber growth. (The FCC auctioned off 1.9 GHz PCS frequencies in the mid-1990's; most of these systems became operational in the late 90's.)

While struggling with the evaluation of TDMA in the early 1990's, large systems such as New York City and LA were in a continuous "cell-split" mode, building more and more small cell sites, and further increasing the ability to reuse the limited spectrum available. An early miscalculation made by the carriers was that the conversion to "digital" brought about immediate capital expenditure relief ("stop building cell sites"). They didn't count on the fact that a high quality digital call needs very consistent and stable signal strength levels. Adding digital channels to the mountaintop site didn't deliver high quality calls in the same areas where analog was acceptable. The result? The conversion to digital required even more sites.

Interestingly, the lack of a "digital flip phone" in the early TDMA days caused more growth in the analog side of the network just as analog system capacity was being replaced by digital radios! The emerging consumer market was enamored by the StarTac, which was only available as an analog unit for many years.

Nextel's network grew by fits and starts, often driven by the acquisition of new channel sets and operating areas as SMR's were purchased and consolidated into the iDEN network. The introduction of iDEN as the fix for MIRS problems further aggravated the situation because, just like the cellular operators learned, plugging a digital radio in place of an analog radio doesn't bring about a miraculous increase in capacity; other changes have to be made. Unfortunately, the iDEN architecture was nowhere near as flexible and feature-rich as cellular in regards to signal and interference control. While cellular networks were able to grow and manage internal interference, Nextel had no way to gracefully grow the network to meet demand, especially when "interconnect" usage began to outgrow dispatch usage (the "flip phone phenomena", again).

This brings us to the present.

The next few pages will refer to the Motorola paper to raise questions and point out issues, which might not be totally clear, or are not mentioned at all.

Page 3

The color chart does a very good job of visually stating the spectrum issue. Simply put, if every licensee stayed within their spectrum band and operated their networks within that spectrum, as licensed, many of the problems being discussed would not exist. Cellular carriers have operated their systems under the "AMPS' rules since the inception; SMR operators have their fixed assignments and operate under the established system architecture rules; only Nextel has tried to make a trunking system operate like a cellular system, while following the rules of neither service.

Page 4

The "near-far" scenario is described, but with little reference to how iDEN technology uniquely contributes to this problem, even within it's own networks. This is rarely a problem with properly engineered cellular systems.

Page 5

The explanation about hardware contributing to some of the current problems is very valid. The question raised here is "why do current 800 MHz band radios have to have bandwidths in excess of 60 MHz (transmit) and 18 MHZ (receive) if for no other reason than manufacturing simplification?" Is it not evident that the interference issues have arisen as these radios have become more prevalent in the field? Public Safety users are the most implicated due to their insatiable appetite for the latest technology and the newest radio features, coupled with their tendency to spend as little money on the network's infrastructure.

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Table 3 lists some of the ideal and not-so-ideal situations that develop as frequency division-type networks have grown (e.g., AMPS, TDMA, GSM, iDEN). Some statements are unclear in regards to iDEN capabilities. Several examples follow:

Transmitter Filtering – iDEN uses hybrid combining in order to allow for a "dynamic frequency plan". Hybrid combining (1) wastes RF energy as heat, and (2) allows transmit signals to mix causing IM (intermodulation) products and OOBE (out of band emissions). This type of combining is claimed to be most accommodating of the Dynamic Frequency Allocation feature, yet cellular carriers

have used auto-tune cavity combiners to do this for years, albeit within a more controllable frequency plan.

Tower Heights - low antenna sites are typically operated at very low RF signal power levels in the cellular configurations; "microcells" operate at signal levels of less than 1 Watt ERP. IDEN does not have the dynamic range in their base equipment to power down; conversely, as more channels at a site are required for capacity, the multiple hybrid combiners require the transmitters to run high power levels anyway. The higher power also helps with in-building penetration.

Not mentioned: cellular AMPS architecture allows a channel to be keyed only when it is needed to provide capacity. The system also allows channel selection in a bottom-up or top-down list, allowing further flexibility to the control of interference within the system. IDEN does not make use of these tools. All channels are keyed, all of the time. Therefore, even when iDEN subscribers are not using the network, the iDEN network is creating IM and OOBE problems to others.

Page 22

The chart on this page is misleading since it doesn't clarify the technology differences. For example, cellular analog networks utilized separate transmitter exciters, amplifiers, and cavity combiners. The technology evolved into the use of low-powered exciters feeding a wideband linear power amplifier which then transmitted through a bandpass SAW filter. TDMA and analog systems shared this technology evolution.

Page 23

A statement is made that says "...SMR's frequently use[s] broadband hybrid combiners to allow frequent frequency changes without requiring site visits". What SMR operator, except for Nextel, experiences the need for "frequent frequency changes"?

In further explaining the chart on the previous page, another misleading statement is made: "The duty cycle indicates whether the transmitter(s) are continuous as cellular type deployments require or intermittent as typical of LMR systems use. Note that when a trunking system is involved, the control channel may be continuous while the voice channels are intermittent". This is blurring the issue...duty cycle and operational cycle are being mixed up. All commercial radio transmitters are rated for continuous duty; cellular channels are NOT operated continuously but only when required. IDEN channels are operated continuously, even when not needed.

The frequency coordination issue is also muddled. All cellular operators coordinate within and outside of their networks on a regular, continuing basis. This has been done since day-one, per FCC requirements. As inter-system handoff became possible, coordination was even more important.

It is pointed out that the cellular carrier can make changes when "...the interference gets strong enough, the system will be able to provide an alternative resource that isn't being interfered with", yet nothing is stated in regards to iDEN capabilities in this regard (there are none). Some cellular systems can automatically "seal" (turn off) a channel that is experiencing interference, taking it off the site's assignment list. Another cellular feature is "directed retry" which will pass a call request to a neighboring site, thus adding to the ability to manage channel assignments and minimize network interference.

Page 26

The chart and description for "Case 1b" clearly summarizes the existing Nextel/Public Safety issue. The "Cellular TDMA" title in the chart could read "iDEN".

Page 27

The plea for higher receiver (portable PS radio) IM performance is valid and has been supported by the cellular carriers who have been involved with the interference issue. Is Motorola, the manufacturer, listening?

The balance of the scenarios are interesting, but the chance of them occurring is magnitudes less possible than the scenario explained in Case 1b.

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We now get into recommendations on how to fix the problems described. Again, as has already been pointed out, there is a lack of specifics related to the internal working of iDEN which might help to highlight some of the challenges.

The number one rule is to make sure "your own house is clean" before looking elsewhere.

It is evident by the way iDEN combines channels and uses tight frequency separation between channels that internal system problems are potentially more prevalent than external problems. Lossy hybrid combiners require large amounts of RF energy to deliver sufficient signal levels. One iDEN scheme calls for 3 dB combiners for every 4 channels at a site. As soon as the fifth channel is needed, another 3 dB combiner is added. The result: as more capacity is added, the RF footprint of the site begins to decrease. As the transmitters are powered up to

compensate, the IM and OOBE potential increases. Hundreds of Watts of RF energy (much of it lost as heat) is generated to deliver several Watts of signal to the antenna. The costs related with the need for increased electrical power and air conditioning to generate and remove the heat are high. Equipment space is increased, adding further costs to operating the system.

Perhaps as a self-audit, Nextel should respond to the "Methods to Reduce Interference of Specific Types" (by item):

A. Are all sites operating within maximum ERP to satisfy licensing and government environmental requirements (NEPA)?
B. Is sufficient attention being given to frequency planning? What tools are being used?
C. Shuffling frequencies is an easy fix to suggest, but at whose ultimate cost?
D. This is at the heart of the iDEN problem...how about lowering the power output of channels that are not providing service, or shutting them off entirely? This minimizes the occurrence of IM and OOBE.
E. Changing antennas while still radiating high signal levels might not be worthwhile.
F. This is a simplistic fix, since changing antennas will also impact the provided coverage. Customers are sensitive to the "before and after" effects of these band-aid fixes.
G. This suggestion is also simplistic in that it promotes the never-ending issues of intrasystem interference and building sites just to mask interference.
H. Same as G.
I. Use cavity combiners (!). Why not? Coupled with D., there might be hope!
J. More sites is not always the answer, especially when zoning issues prevail.

E through J are the challenges faced every day by the Nextel RF Engineer. Trying to balance the need for increased capacity and coverage while trying to establish channel assignments which minimize IM and OOBE and also allow the most flexibility in capacity distribution is very difficult. It is not unusual in large iDEN systems to experience "no service" when standing in front of an iDEN cell site. This is often due to the combination of IM products from that site, overload in the subscriber's portable, and interference from a co-channel site.

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The "Possible Actions..." section is a checklist for the Public Safety industry. These operators still think their networks can be sophisticated enough to use exotic data systems and speech encryption and still only need one 500-foot tower to serve the entire target area. As soon as they begin designing their networks as "systems" (like the cellular people have always done) then perhaps they will resolve many of the issues they now face. Is Motorola going to take their own advice?

SUMMARY

It is evident that the problems faced by Nextel have been self-imposed from the beginning. Trying to patch together frequency assignments that were made with a certain use and technology in mind is a difficult challenge, even if it only causes internal system problems. But now it is clear that everyone has been dragged into Nextel's nightmare. There is no doubt that rearranging the entire 800 MHz band would help matters to a certain degree; but, will it actually make the current problems go away? The consensus is that the answer is "No!".

Motorola has patched together the iDEN architecture while ignoring many of the very tools and features that would make it work better. I was once told that the Motorola iDEN development team did not have one engineer with cellular system experience on the team.

It had been hoped that a technological leap would be made in both the basic architecture and equipment form factors, but that will probably not happen quickly. Whatever Nextel's next technology direction might be, it must take into account the tools and features which have enabled cellular networks to grow more quickly and serve more subscribers than Nextel ever could. If Nextel is not willing to discuss future technology improvements in relation to this current Public Safety interference issue, then perhaps this radical frequency-swap proposal should be placed on hold. The very people who will be most impacted are the ones who have been going by the rules.

Nextel has technology issues which need to be addressed before the entire 800 MHz spectrum gets turned upside down. Instead of proposing an external fix (complicated and costly to others) why not spend the money and effort to clean up their own (archaic) system architecture? Otherwise, the problem will still be there after the dust settles. Wouldn't it be in Nextel's best interests to operate an efficient, cost-effective and flexible network architecture?

Public Safety, which probably consumes slightly less spectrum than the federal government, might also have to look more closely at technology to serve their needs than just "more frequencies". How do they explain the Lowband, VHF and UHF frequencies that they continue to hold yet not use? Do they really think that the 700/800/900 MHz networks of the future are going to give them ubiquitous coverage? Do they think that in-building coverage is going to happen magically when they get more spectrum? While there has been a lot of talk since 9/11/2001 about interoperability and reliable public safety communications, there has been little real action taken. Haven't they seen what the cellular/PCS carriers (and, yes, even Nextel) have gone through to build out their networks in the face of public opposition to "more towers"? Perhaps some of their interference issues are self-caused.

Finally, Motorola has a responsibility to all of the above. The "Technical Appendix" raises a lot of good points and offers some useful suggestions to improve service. But, someone has to take that paper and agree to implement the changes. Ultra-wideband radios are built by Motorola; many of the existing SMR systems are Motorola-based; Nextel is an exclusive iDEN infrastructure user; most large Public Safety networks, present and future, will utilize Motorola products. It is evident that Motorola has as much at stake as Nextel as far as delivering well-designed and engineered systems.